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| EXAMINER | |
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**BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

Application Number: 10/599,765
Filing Date: November 17, 2006
Appellant(s): BUSHBY, ROGER STANLEY

Darin J Gibby
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal briefs filed May 13, 2001 and June 6, 2011 appealing from the Office action mailed October 20, 2010.

**(1) Real Party in Interest**

The examiner has no comment on the statement, or lack of statement, identifying by name the real party in interest in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The following is a list of claims that are rejected and pending in the application:

Claims 19, 21-24 and 31.

**(4) Status of Amendments After Final**

The examiner has no comment on the appellant's statement of the status of amendments after final rejection contained in the brief.

**(5) Summary of Claimed Subject Matter**

The examiner has no comment on the summary of claimed subject matter contained in the brief.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The examiner has no comment on the appellant's statement of the grounds of rejection to be reviewed on appeal. Every ground of rejection set forth in the Office action from which the appeal is taken (as modified by any advisory actions) is being maintained by the examiner except for the grounds of rejection (if any) listed under the subheading "WITHDRAWN REJECTIONS." New grounds of rejection (if any) are provided under the subheading "NEW GROUNDS OF REJECTION."

**(7) Claims Appendix**

The examiner has no comment on the copy of the appealed claims contained in the Appendix to the appellant's brief.

**(8) Evidence Relied Upon**

| | | |
|---|---|---|
| 4,573,519 | DONOMOTO et al. | 3-1986 |
| JP 62-72,756 | SEISAKUSHO | 5-1987 |

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

Claims 19, 21-24, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 4,573,519 to Donomoto et al. and as evidenced by JP 62-72,756 (for claim 31 only; note this evidentiary reference was applied in the Final rejection but not listed in the rejection heading).

Donomoto et al. show a method for forming a metal matrix composite article. The method comprises a series of steps: a first step wherein a reinforcing material is set in a retaining tool 3 (retainer) mainly composed of a water soluble salt with a high melting point; a second step wherein the reinforcing material set in the retaining tool is heated above certain temperature and then installed in a mold 5 which has cavity for receiving the retaining tool 3; a third step wherein molten matrix metal is contacted with and impregnated into the reinforcing material in the retaining tool and then solidified to form a metal base composite with the reinforcing material embedded therein; and a fourth step wherein the product (retaining tool 3 plus the composite article) is removed from the casting mold 5 with a knock-out plunger 6, and product is dipped in water to dissolve the retaining tool 3 away to obtain the metal matrix composite article (col. 2, lines 39-53 and col. 4, lines 21-27). The retaining tool 3 in which a reinforcing material is installed is subjected to heating, to prevent insufficient impregnation of the molten matrix metal into the pores of the preform of a reinforcing material due to premature solidification of the metal. Therefore, it is preferable to heat the retaining tool 3 above the melting point of the matrix metal (col. 3, lines 12-18). The reinforcing material may be powder, flake or fiber including carbon fibers, silicon nitride fibers or ceramic whiskers (col. 3, lines 6-8). In one example, the molten aluminum alloy preheated at 750 degree C. was quickly poured in the mold and a pressure of 1000 $kg/cm^2$ (980 bar) was applied by use of upper mold 51 (which is considered as a compaction piston) projected into the mold cavity.

The interior of the casting mold 5 had been kept at 300 degree C. until the retaining tool 3 was installed in the mold (col. 4, lines 10-19).

Thus, Donomoto et al. substantially show the invention as claimed except that they do not show to provide a third part corresponding to the first part for repeating the casting steps as claimed in last step of claim 19 while the first part is cooling.

However, Donomoto et al. do disclose that the water soluble salt used for the retainer can be recycled for reuse (col. 4, lines 35-37 and col. 5, lines 38-39). Thus, it would have been obvious to provide a plurality of retainers for a close loop die casting operation by continuously recycling the salt and then use the recycled salt to make new retainers for sequentially casting of the composite articles. Donomoto et al. in col. 4, lines 22-24 further states that after solidification of the aluminum alloy, the product is removed from the casting mold 5. It would have been obvious to remove the retainer 3 from the casting mold as soon as the molten aluminum solidified such that a new retainer may be placed into the casting mold for casting another composite article and thereby speeds up the casting process.

With respect to claim 31, since it is conventional to use split die in a casting process as evidenced by JP 62-72,756, it would have been obvious to form the retaining tool 3 (inside mold) and outside mold 5 of Donomoto et al. from split parts and removing the retaining tool 3 (inside mold) from the outside mold 5 with an appropriate manner in view of the conventional practice. Further, the

mere fact that a given structure is integral does not preclude its consisting of various elements, Nerwin v. Erlichman, 168 USPQ 177, 179. It is further noted that in col. 2, lines 3-7 of Donomoto et al. they describe that figure 1 shows the device for making the retainer used in the first embodiment and that figure 2 shows the mold used in the first embodiment. As clearly shown in figure 1, the concavity 30 is the half of cavity of the retainer 3 shown in figure 2. Donomoto et al. further state that the filaments were installed and suitably oriented in the concavity of the retainer. A couple of retainers 3 were fixedly united, with their concavities facing each other (col. 3, line 67 through col. 4, line 3). Thus, from those disclosures, it is apparent that the retainer shown in figure 2 is actually consisting of two pieces (i.e. a split die). Thus, claim 31 is deemed to be unpatentable over the Donomoto et al.

**(10) Response to Argument**

a. Appellant's main argument is that Donomoto et al. fail to teach the use of a first die cavity that is replaced with another die cavity while the first die cavity cools. However, as stated supra, Donomoto et al. do disclose that the water soluble salt used for the retainer (retaining tool) can be recycled for reuse (col. 4, lines 35-37 and col. 5, lines 38-39). Thus, it would have been obvious to provide a plurality of retainers for a close loop die casting operation by continuously recycling the salt and then use the recycled salt to make new retainers for sequentially casting of the composite articles. Donomoto et al. in col. 4, lines 22-

24 further states that after solidification of the aluminum alloy, the product is removed from the casting mold 5. It would have been obvious to remove the retaining tool 3 from the casting mold as soon as the molten aluminum solidified such that a new retaining tool may be placed into the casting mold for casting another composite article and thereby speeds up the casting process. Donomoto et al. also states that the molten matrix metal is unlikely to be cooled by the mold due to the excellent heat insulation of the retainer (col. 3, lines 48-50). Thus, it is unlikely that those of ordinary skill in the casting art would let the retaining tool 3 remain in the mold 5 and cool after the molten matrix metal solidified since it would take a long period of time for the composite article to cool down to a lower temperature and would reduce the efficiency and increase and operation cost. Thus, it would have been obvious for those of ordinary skill in the casting art to remove the retaining tool 3 from the mold 5 and let it cools independently as soon as the molten matrix metal has solidified thus that another retaining tool may be inserted into the mold 5 for making another composite article and thereby increases the operation efficiency.

b. Appellant in page 6, last para. of the appeal brief stated that there is no rational expectation for one of skill in the art to combine the teachings of JP 62-72,756 with that of the Donomoto et al. reference. However, JP '756 shows that it is conventional to use a split die in a casting process. Further, Donomoto et al. show in figure 1 that the concavity 30 is the half of cavity of the retaining tool shown in figure 2 and that the filaments were installed and suitably oriented in

the concavity of the retainer. A couple of retainers 3 were fixedly united, with their concavities facing each other (col. 3, line 67 through col. 4, line 3). Since JP '756 shows the conventionality of using a split die and Donomoto et al. implicitly shows the use of retainer made of two parts, it would have been obvious to make the retainer of Donomoto et al. as a split retainer (split die) in view of the prior art teaching as a whole.

**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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